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ABSTRACT

The Smithsonian Science Information Exchange is intended to be a clearinghouse for information on current research in physical, biological, and social sciences. The information is compiled to facilitate more effective planning and coordination of research and development programs sponsored by Federal funds. This report informs the Congress of a situation in which failure on the part of Federal agencies to report all pertinent information to the Exchange is hindering the effective coordination of Federal research programs. It is recommended that the role of the Exchange should be evaluated by the Office of Management and Budget, and if it is decided to continue the Exchange, Federal agencies should be required to submit pertinent, timely information about their research projects to the Exchange. (Author/NH)

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REPORT TO THE CONGRESS

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Effectiveness Of Smithsonian Science Information Exchange Hampered By Lack Of Complete, Current Research Information

B-175102

Smithsonian Institution

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

MARCH 1,1972

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-175102

To the President of the Senate and the
Speaker of the House of Representatives

This is our report entitled "Effectiveness of Smithsonian Science Information Exchange Hampered by Lack of Complete, Current Research Information." The Exchange is administered by the Smithsonian Institution.

Our review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Director, Office of Management and Budget; the Secretary, Smithsonian Institution; the Director, National Science Foundation; and the Director, Office of Science and Technology.

Elmer B. Staats

Comptroller General
of the United States

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ABBREVIATIONS

GAO	General Accounting Office
NSF	National Science Foundation

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

EFFECTIVENESS OF SMITHSONIAN SCIENCE INFORMATION EXCHANGE HAMPERED BY LACK OF COMPLETE, CURRENT RESEARCH INFORMATION

Smithsonian Institution B-175102

D I G E S T

WHY THE REVIEW WAS MADE

The Smithsonian Science Information Exchange is intended to be a clearinghouse for information on current research in physical, biological, and social sciences. The information is compiled to facilitate more effective planning and coordination of research and development programs sponsored by Federal funds.

For fiscal years 1963 through 1971, appropriations of about $12.7 million were made to the National Science Foundation for the operation of the Exchange by the Smithsonian Institution. Beginning with fiscal year 1972, the entire responsibility for the Exchange was assumed by the Smithsonian Institution, which received an appropriation of about $1.3 million for that year.

Annual Federal expenditures for research have totaled about $5 billion in recent years. Because the Exchange can be an important source of information for coordinating Federal research, the General Accounting Office (GAO) has made a review of how the Exchange was run and how Federal agencies contributed to, and used, its services.

FINDINGS AND CONCLUSIONS

Many Government agencies are not using the Science Information Exchange to the fullest extent because, they claim, its data bank is not current or complete. At the same time the ability of the Exchange to provide current information is being hampered because the agencies are not providing the Exchange with the information it must have to perform the function of an information clearinghouse.

Government agencies are not required to submit complete information on their research and development programs to the Exchange. But the Exchange cannot be an effective tool for coordinating Federal research without up-to-date information.

A significant decline in the use of the Exchange between 1968 and 1970 can be attributed, in part, to the charges levied for carrying out information searches of the Exchange's files. Also agencies used the Exchange less frequently because its information, being incomplete and obsolete, was of limited use to them. (See pp. 12 and 14.)

Tear Sheet

5 MARCH 1973

RECOMMENDATIONS OR SUGGESTIONS

The Office of Management and Budget should evaluate the role of the Science Information Exchange as part of the Office's responsibility for fostering coordination of Federal programs. If it is found that the Exchange should be continued, Federal agencies should be required to submit pertinent, timely information about their research projects to the Exchange. (See p. 18.)

AGENCY ACTIONS AND UNRESOLVED ISSUES

Agencies and departments commenting on this report agreed that the Exchange would play a more important coordinating role if the agencies were required to provide the Exchange with information on their research projects. Agencies which had not submitted complete and timely information generally indicated that such a requirement was desirable. (See pp. 19 to 21.)

The Office of Management and Budget agreed to study the role of the Exchange. On the basis of the findings of the study to be made under the sponsorship of the Smithsonian Institution, the Office will decide whether to continue the Exchange and whether to require agencies to report their research activities to the Exchange. (See p. 21.)

MATTERS FOR CONSIDERATION BY THE CONGRESS

This report informs the Congress of a situation in which failure on the part of Federal agencies to report all pertinent information to the Exchange is hindering the effective coordination of Federal research programs.

CHAPTER 1

INTRODUCTION

The Science Information Exchange[1] was administered by the Smithsonian Institution under a contract with the National Science Foundation (NSF). The contract provided that NSF be responsible for establishing policy for the operation of the Exchange. In establishing this policy NSF was assisted by an advisory board composed of representatives of the National Aeronautics and Space Administration, the Atomic Energy Commission, the Department of Defense, and nine other agencies that participate in the Exchange.

Although there is no specific legislative authority establishing the Exchange, its origin dates back to 1949 when six Government agencies and departments, engaged in medical research, created an information exchange to serve as a clearinghouse for in-progress scientific research in the medical and allied fields. The scope of the Exchange was expanded in 1953 to include all life sciences research and in 1960 to include physical and social sciences research.

By Memorandum No. 1766 dated October 24, 1964, the President designated the Exchange as a center for cataloging current and projected scientific research in all areas of water resources. The President stated that each Federal agency doing water resources research, required by the Water Resources Research Act of 1964 (42 U.S.C. 1961), shall cooperate by providing the Exchange with information on work under way or scheduled.

Funds for the operation of the Exchange were originally provided by several agencies, including the Department of Defense, the Atomic Energy Commission, the Public Health Service, and the Veterans Administration. To alleviate the problems associated with multiagency management and funding

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[1] In June 1971, the Exchange was incorporated as a nonprofit corporation under the laws of the District of Columbia and was renamed the Smithsonian Science Information Exchange, Incorporated.

of the Exchange, the Director, Office of Science and Technology, Executive Office of the President, requested NSF in 1963 to assume the management and funding of the Exchange with the understanding that the operation of the Exchange would continue under the Smithsonian Institution.

For the 8-year period July 1, 1963, through June 30, 1971, about $12.7 million was appropriated to NSF for operation of the Exchange. Pursuant to an agreement between NSF and the Smithsonian Institution, all fiscal and administrative responsibilities for the Exchange were transferred, effective fiscal year 1972, to the Smithsonian Institution. For fiscal year 1972, $1.3 million was appropriated for the Smithsonian Institution's operation of the Exchange.

HOW THE SYSTEM OPERATES

The charter for the management and operation of the Exchange was developed by NSF in 1964. The charter requires the Exchange to develop and maintain an up-to-date comprehensive file, or register, of descriptive information concerning all types of unclassified scientific research projects in the physical, biological, and social sciences currently supported or sponsored by Federal agencies.

The Exchange gathers current information on research projects undertaken by Federal, State, and local agencies and by nonprofit, educational, and commercial research organizations. The information includes the organizations performing the research, the supporting organizations, the title of the research project, a brief description of the research objectives, the names of the principal investigator and coinvestigators, the period of performance, and funding information. This information is indexed and is entered into the Exchange computer by a staff of nonprofessional clericals and professional scientists and engineers.

The Smithsonian Institution's pamphlet entitled "Science Information Exchange: A National Registry of Research in Progress" includes a list of potential uses for the Exchange. The Exchange is to be used to (1) avoid duplication in planning new research, (2) find out what a given investigator is working on, (3) detect trends and shifts in research interests, and (4) compare and coordinate projects and

programs among agencies with overlapping interests and missions.

According to the Smithsonian Institution, the Exchange is the only information system of its type in the world that covers all aspects of basic and applied research in a uniform and coherent manner so that interagency and multiagency efforts can be quickly and uniformly mobilized.

Any scientist, research administrator, investigator, or manager can receive information from the Exchange for a fee intended to recover the cost of the service. The information is available in the form of statistical summaries, tabulations, and complete or partial printouts. The physical arrangement of information can be specified by the user. The commonly used services of the Exchange include:

--Subject content searches which provide information on all research projects related to a specific topic.

--Administrative content searches which provide information on all research projects related to a given county, State, or institution.

--Investigator searches which provide information on research projects associated with a given name (investigator).

--Standard computer tabulations and listings of all research projects based on any selection criteria and arranged in various sequences with appropriate totals and subtotals.

--Catalogs by research subject appropriately indexed to project location, investigator, and source of support.

--Historical searches which provide information by subject and administrative content on all research projects stored on tapes at the Exchange since 1949.

The Exchange's data bank is updated as new information is reported by organizations undertaking research. A project whose status has not been updated for 2 years is removed

from the data bank and is placed on tape for storage and future use in historical searches. As of June 30, 1970, the Exchange had received notices of approximately 91,000 research projects that were in process during fiscal year 1969, of which about 71,300 had been reported by 24 Federal agencies. The remaining research projects had been reported by 963 non-Federal agencies and commercial research organizations. During fiscal year 1970 the Exchange responded to approximately 5,700 requests, including 4,000 requests from Federal agencies.

During the fiscal year ended August 31, 1970, the Exchange billed its customers about $211,000 for services provided. During the same period NSF provided to the Smithsonian Institution $1.6 million for support of the Exchange. Income from user charges is applied against the operating costs and has been considered in NSF's appropriations. The Smithsonian Institution operates the Exchange as a non-Federal private operation.

Our review, which was conducted primarily at the Exchange, was directed toward examining into the effectiveness of the Exchange and included a review of the policies, procedures, and practices of selected agencies in participating in the Exchange. It also included discussions with officials in the Office of Management and Budget and the Office of Science and Technology regarding their policies for agency cooperation with the Exchange.

CHAPTER 2

COMPLETE AND TIMELY SUBMISSION OF INFORMATION NEEDED TO IMPROVE EFFECTIVENESS OF THE EXCHANGE

The primary purpose of the Exchange is to facilitate more effective planning, management, and coordination of research and development activities supported by Federal funds. Federal agencies have not been required to provide, and have not systematically provided, complete research and development information to the Exchange. As a result the Exchange's information is neither complete nor current. The Exchange therefore cannot provide Federal, State, and local agencies and nonprofit, educational, and research organizations with accurate and complete information on current research and development projects.

NOT ALL INFORMATION SUBMITTED TO THE EXCHANGE

We noted that, although a high percentage of the research projects of some agencies had been reported to the Exchange, a significant amount of work sponsored by other agencies had not been reported.

Our review of a selected sample of research projects--financed in fiscal year 1969 by the Office of Education, by the National Institutes of Health of the Department of Health, Education, and Welfare, and by NSF--showed that over 90 percent of the projects sampled were registered at the Exchange. By contrast the National Aeronautics and Space Administration submitted information to the Exchange on only 654 of an estimated 5,000 research projects in fiscal year 1970. The Atomic Energy Commission provided information to the Exchange on about 1,100 of an estimated 3,000 unclassified research projects conducted by its Division of Biology and Medicine and by its Division of Research during fiscal year 1970.

Both the National Aeronautics and Space Administration and the Atomic Energy Commission advised us that they did not have explicit requirements for use of the Exchange's services or for the submission of information to the Exchange.

The National Aeronautics and Space Administration explained that during fiscal year 1969 it revised its agency-wide system for reporting research and development project information and that, although the revised system provided less detail than did the old system, new summaries of projects for fiscal years 1970 and 1971 had been submitted to the Exchange. Project summaries for fiscal year 1972 were to be submitted to the Exchange during October 1971, and thereafter project summary information was to be provided to the Exchange within 60 days of the beginning of each fiscal year.

The President, formerly the Vice President, of the Exchange told us that he did not consider the information submitted by the National Aeronautics and Space Administration under its new system to be adequate because the new summaries did not provide the detailed information considered desirable by the Exchange for individual projects.

The Atomic Energy Commission indicated that, although not all its components had submitted complete information to the Exchange, the Division of Biology and Medicine regularly submitted information to the Exchange. Our review, however, showed that the Division submitted information to the Exchange on only about 600 of about 1,600 research projects conducted during fiscal year 1970.

Nine other agencies, which reported to NSF estimated obligations for basic and applied research of $13 million in fiscal year 1969 and $16 million in fiscal year 1970, did not report to the Exchange any information on these research activities.

One of these agencies was the Social Security Administration which had estimated obligations for basic and applied research, excluding research supported under cooperative agreements with other agencies, of $7.4 million in fiscal year 1969 and $11 million in fiscal year 1970. The Social Security Administration, in commenting on a draft of this report, stated that in the future information on extramural research projects would be submitted to the Exchange; however, with respect to in-house research, the Social Security Administration explained that it did not believe the Exchange was intended to cover such research.

The other eight agencies which did not report information on their research activities were the Office of Science and Technology, Civil Aeronautics Board, Federal Communications Commission, Federal Home Loan Bank Board, Library of Congress, Federal Trade Commission, Office of Emergency Preparedness, and United States Information Agency.

INFORMATION NOT SUBMITTED TIMELY

Our review showed that several agencies did not submit research information on a timely basis. Although there was no time requirement for the submission of information to the Exchange, the Vice President of the Exchange stated that, to achieve the maximum benefit from the Exchange, information on new or updated research projects should be reported within 60 days after their initiation or after a change in their status.

Our review of a test sample of information received at the Exchange during January, February, and March 1971 showed that most of the information on new or updated research projects had been submitted more than 5 months after the start of the applicable research or after a change in the status of ongoing projects. Some of the information had been reported as much as a year after the research projects were started or their status was changed.

For example, during the 3-month period, the Bureau of Mines, Department of the Interior, reported information on 380 research projects. The information on 229 of these projects was reported 6 months or more after the projects had been started or revised. The Veterans Administration reported information on 194 research projects. The information on 134 of these was reported between 75 days and 9 months after the research had been started. Also, the National Bureau of Standards, Department of Commerce, submitted information in February and March 1971 for 473 of 507 research projects at least 9 months after the projects were started or their status was changed.

Various reasons were given by Federal agencies for the delays in submitting information to the Exchange. The Department of the Interior has advised us that it furnishes the Exchange with information on new research projects and

on revisions to existing projects annually at the time appropriations are programmed. An official of the Veterans Administration explained that in some cases intra-agency processing of reports for submission to the Exchange had taken several weeks. The Department of Commerce stated that submission of information on Bureau of Standards research projects had been delayed because the Bureau was engaged in redesigning its internal project reporting system and that the new system would permit future submissions to the Exchange to be complete, accurate, and timely.

AGENCIES NOT REQUIRED TO PROVIDE INFORMATION TO THE EXCHANGE

Except for the President's memorandum of October 24, 1964, requiring Federal agencies to submit research information on all areas of water resources, no requirements exist for agencies to collect and report information to the Exchange on their research activities. Two studies on operations of the Exchange concluded that more complete coverage of all research was needed to improve the effectiveness of the Exchange.

One study in 1964 by the Select Committee on Government Research, House of Representatives, concluded that the Exchange had been useful and recommended that research-supporting departments be required to submit information to the Exchange so that the information in the system would be complete.

The second study--which was conducted by an ad hoc committee of users, formed by the Smithsonian Institution in September 1970 to review the Exchange and its future from the viewpoint of its value to the users--reached similar conclusions. The committee was composed of representatives of the Office of Naval Research, the Public Health Service, the Atomic Energy Commission, the Veterans Administration, and the Council on Environmental Quality and was chaired by the director of the Biological Science Communications Project of the George Washington University. The committee concluded that the Exchange had been an effective organization in spite of its many administrative and fiscal difficulties and that the Smithsonian Institution might need to enlist the aid of the Office of Management and Budget to

obtain more complete coverage of all research performed by the various Federal agencies.

Officials of the Exchange, NSF, and the Smithsonian Institution with whom we discussed the lack of a requirement for Federal agencies to submit information to the Exchange recognized that the effectiveness of the Exchange was dependent upon the Exchange's acquiring complete and current information on research supported by Federal agencies. They advised us, however, that their agencies could not require other Federal agencies to submit information to the Exchange.

The Office of Science and Technology, Executive Office of the President, has the overall responsibility for coordinating scientific information services within the Federal Government. Officials of that Office advised us, however, that, because of its staff position, the Office of Science and Technology does not have authority to direct the activities of Federal agencies and therefore it had not formulated a policy to require Federal agencies to submit information to the Exchange.

The Office of Management and Budget has the responsibility and the authority for coordinating Federal agency programs; however, it has not required Federal agencies to participate in the Exchange. We discussed this matter with officials of the Office of Management and Budget, and they advised us that the Office had not issued procedures requiring agencies to report information to the Exchange because the procedure of permitting agencies to submit information on a voluntary basis had been considered adequate.

CHAPTER 3

LIMITED USE OF EXCHANGE

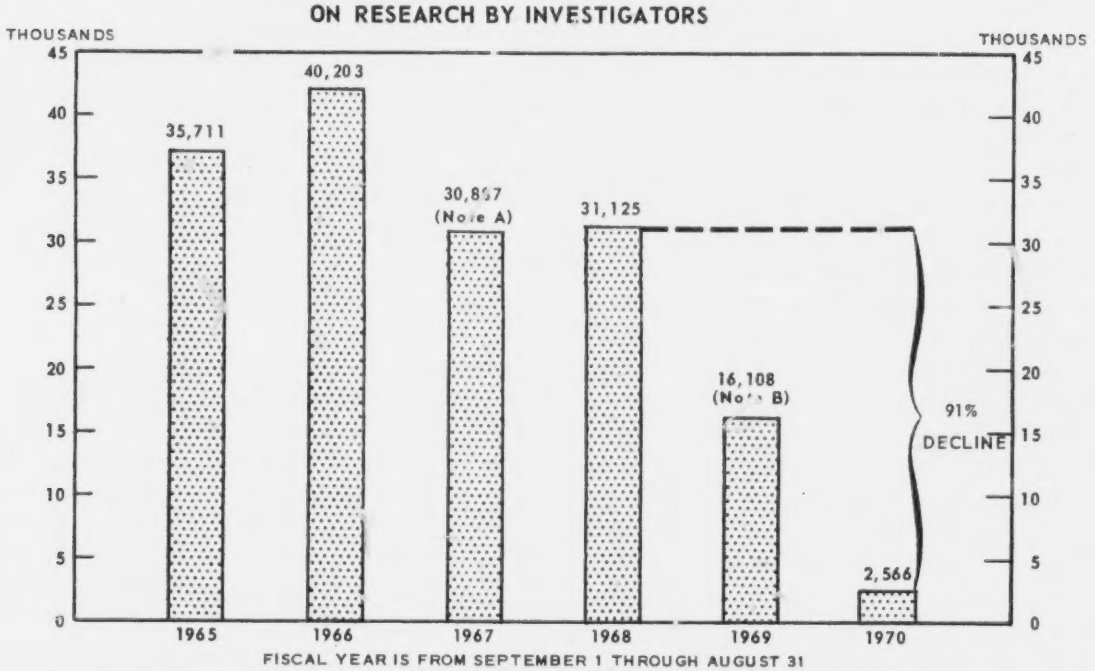
In designating the Exchange as the information center for water resources research, the President stated that the Federal agencies were expected to make full use of the Exchange, in addition to using internal information systems, and other means which might be required for good management. Our review showed that several Federal agencies had made limited use of the services provided by the Exchange and that, generally, use of the Exchange's services by Federal agencies had significantly declined between 1968 and 1970.

Our comparison of statistics on several categories of services provided by the Exchange to Federal agencies for the fiscal year ended August 31, 1968, with similar statistics for the fiscal year ended August 31, 1970, showed that the percentage of decline in the use of these services ranged from 20 percent to 91 percent. The following graphs show, for example, that from 1968 to 1970 the number of requests for information on research performed by principal investigators had declined by 91 percent and that the number of questions associated with particular research subjects had declined by 68 percent.

Officials of the Exchange explained that the decline in the use of the Exchange could be attributed, in large part, to the initiation, at various times during the fiscal year ended August 31, 1969, of charges for services that had previously been provided without cost. Charges vary for individual services. For example, charges for subject content searches ranged from $40 to $60 and for investigator searches were $2 for each name searched.

The Smithsonian Institution pointed out that searches for research information by investigator, which represents about 5 percent of the Exchange's total output, decreased drastically as indicated by the graph on page 13 because of policy changes by important users rather than because of decreasing interest in the total services of the Exchange. This, according to the Smithsonian, had been apparent for some years and had prompted the Exchange to consider offering

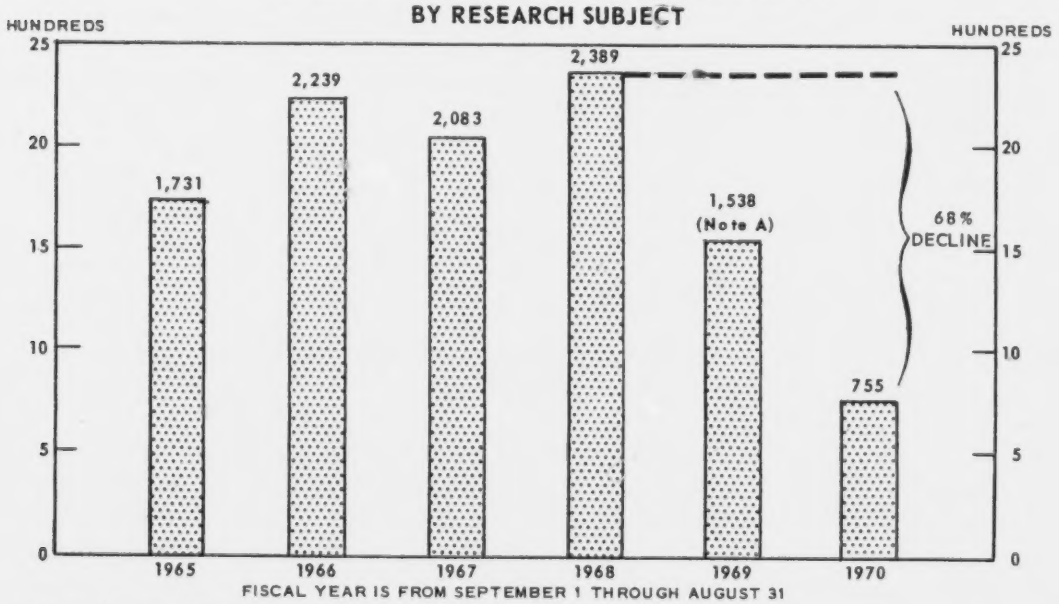
FEDERAL AGENCY REQUESTS FOR INFORMATION ON RESEARCH BY INVESTIGATORS



A. Because of limited funds available in fiscal year 1967, the Exchange would only search its data bank for a maximum of six investigator names per request. This accounts for the decline in investigator reports for fiscal year 1967. There was no limit to the number of names in the other years.

B. User charges started December 1968.

FEDERAL AGENCY REQUESTS FOR INFORMATION BY RESEARCH SUBJECT



A. User charges started July 1969.

other information services in response to changing user needs and interests. The Smithsonian Institution advised us regarding subject searches that nearly all Federal agencies increased their use of this service in fiscal year 1971.

Our review indicated, however, that the decrease in use of the Exchange was attributable also to the incomplete and obsolete data in the Exchange. The Air Force Office of Scientific Research, which had research obligations of about $33 million in fiscal year 1970, made very little use of the Exchange's services. The Director of Defense Research and Engineering, in commenting on a draft of this report for the Department of Defense, advised us that the limited use of the Exchange by the Air Force Office of Scientific Research was attributable to the incompleteness and lack of timeliness of the Exchange's data base.

The Atomic Energy Commission advised us that the practices for using the Exchange's services varied among programs, fundamentally as a result of the differing needs among Atomic Energy Commission programs for information of the type which the Exchange handled and also as a result of the varying adequacy of information available from the Exchange.

The Head of the NSF Office of Science Information Service, in a memorandum dated August 19, 1969, to the Director, NSF, concerning the transfer of the Exchange to the Smithsonian Institution stated:

> "*** NSF's records show that its usage of [the Exchange], which was quite limited even when the service was free, dropped by 2/3 after the introduction of charges."
>
> "*** [NSF] certainly does not use [the Exchange] data for planning purposes."

The Deputy Head, Office of Science Information Service, NSF, explained that, because the information in the Exchange was not current or complete, it was not considered useful for planning purposes. In commenting on a draft of this report, NSF stated that the information maintained in the Exchange's data bank had limited value in its planning and coordinating

of agency programs because NSF placed greater emphasis on information concerning the present and future plans for the support of research by other agencies than on information concerning actions taken in the present or earlier fiscal years. NSF advised us, however, that the Exchange could provide valuable information to Federal agencies involving research areas which were new to them.

Other agencies which made very limited use of the Exchange's services included the National Aeronautics and Space Administration and the Departments of Transportation, the Interior, Justice, and Labor. Estimated obligations for research support by these agencies in fiscal year 1970 totaled about $1.7 billion. These agencies gave the following reasons for their limited use of the Exchange.

--The National Aeronautics and Space Administration stated that it utilized several methods to exchange project information directly with agencies whose research and development interests closely paralleled its own. These included (1) the interchange of personnel with other Federal agencies, (2) working agreements with other Federal agencies for the exchange of information, and (3) membership on interagency committees through which the Administration keeps apprised of the research and development plans of other agencies.

--The Department of Transportation stated that it had its own information service which integrated information from Exchange files with that from its own files concerning transportation-related information and that, through this use of the Exchange's files, the Department had became aware of the Exchange's incompleteness. Therefore the Department initiated efforts to negotiate direct agency-to-agency exchanges to gain access to all transportation-related research and development information. The Department believes that, as long as the Exchange's files are incomplete, the Exchange will be underutilized and Federal agencies will continue to make bilateral interagency information exchange agreements despite their desire to use the Exchange as a central interchange facility.

--The Bureau of Mines, Department of the Interior, found the Exchange's information on minerals research to be so limited that it was of marginal value; in many instances, when requesting information from the Exchange, the Bureau received its own previously submitted information.

--The Department of Justice stated that, after reviewing our draft report, it conducted a brief survey which disclosed a potentially broader use of the Exchange by some of the Department's offices; however, prior to receiving our report, the offices were not aware either of the Exchange or of the extent of the Exchange's coverage in areas other than the physical sciences.

--The Department of Labor believed that the Exchange's information was inadequate, uneven, and out of date and was oriented primarily to scientific fields largely outside its jurisdiction and that some fundamental changes would have to be made if the Exchange were to work effectively in the Labor Department's areas of research interest.

On January 31, 1969, Peat, Marwick, Livingston and Company, a management consulting firm, published a two-volume report on the results of its broad study on Government-wide research and development reporting, which was undertaken at the request of the Office of Science and Technology. The report pointed out, with respect to the Exchange, that:

--The Exchange was not widely used by agency research and development management for exchanging information between agencies.

--Agency management use of the Exchange involved, to a large extent, functions more appropriately discharged by internal information systems.

--There was a tendency for agency use of the Exchange to vary inversely with the effectiveness of internal agency systems. Agencies having good internal systems provided machinable output to, but did not often query, the Exchange; agencies having limited data processing capability made the widest use of the Exchange.

CHAPTER 4

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

In our opinion, the Exchange cannot effectively fulfill its purpose of providing information on active research and development to facilitate better planning, management, and coordination of research activities unless the agencies which support research cooperate by furnishing current and accurate information to the Exchange.

Inasmuch as the annual Federal expenditures for research total about $5 billion, the Exchange could serve a useful purpose by supplying information from one convenient central source if that source contained current and complete information on all the research efforts supported by Federal agencies. In view of the limited participation by Federal agencies in contributing information to, or requesting information from, the Exchange, many managers of Federal research programs may not consider the Exchange necessary for carrying out their responsibilities.

The Peat, Marwick, Livingston and Company, in its 1969 study report, stated that the services traditionally provided by the Exchange were becoming less valuable to the Federal scientific community and would eventually be superseded through the development of internal agency systems, which, according to the report, were being developed rapidly.

The Smithsonian Institution was not in agreement with the position taken in the study report because the Smithsonian believed that it was unlikely that an agency's internal automated system could provide information about other agencies' activities in areas of mutual interest.

Also NSF expressed the belief, regarding the study report, that the Exchange's function should be complementary to, but not competitive with, information systems of the Federal agencies. Consistent with the study report, however,

the National Aeronautics and Space Administration expressed the view that the optimum mechnism for exchanging information on ongoing research within the Federal Government would be the development, by all agencies supporting or performing research, of internal systems which would allow one agency to query another's information in a network mode.

Because the Office of Management and Budget has overall responsibility for assisting in developing efficient coordinating mechanisms to implement Government activities and in expanding interagency cooperation, we discussed the operations of the Exchange with officials of that Office. They advised us that the Office had not made a decision concerning the mission and utility of the Exchange. Inasmuch as it is doubtful that the Exchange is effectively serving its intended purpose, we believe that it is essential for the Office of Management and Budget to give timely consideration to the future role of the Exchange.

RECOMMENDATIONS TO THE DIRECTOR OFFICE OF MANAGEMENT AND BUDGET

We recommend that the Office of Management and Budget have a study made to determine whether the Exchange is needed. We recommend also that, if it is determined that operation of the Exchange should be continued, the Office require all Federal agencies to submit pertinent information to the Exchange on a timely basis so that the Exchange can effectively serve its intended purpose.

CHAPTER 5

AGENCY COMMENTS

We received comments on a draft of this report from the Office of Management and Budget, Smithsonian Institution, NSF, Office of Science and Technology, Atomic Energy Commission, National Aeronautics and Space Administration, Veterans Administration, and Departments of Commerce; Defense; Health, Education, and Welfare; the Interior; Justice; Labor; and Transportation. The comments of the Office of Management and Budget, Smithsonian Institution, and NSF are appended to this report; comments from all the agencies were considered in finalizing this report.

These agencies generally agreed with our findings and conclusions. Most agencies supported the principle of the Exchange and indicated that the Exchange had the potential to provide essential coordinating services for management of federally and privately sponsored research activities. They cited, however, certain fundamental problems that adversely affected the usefulness of the Exchange.

The Smithsonian Institution, by letter dated September 28, 1971 (see app. II), stated that it concurred in our finding that Government agencies had not been required to furnish, and had not systematically and promptly furnished, their total research and development information. The Smithsonian Institution pointed out, however, that the demand for the Exchange's services appeared to be increasing and that the predominant part of this increase was Federal use as reflected by both volume of requests and dollar income. This, according to the Smithsonian, suggests that Federal users find the Exchange to be a useful service and are willing to pay for it even though it is not complete in coverage. The Smithsonian said also that, as user education programs increased and completeness of the data bank was achieved, use of the Exchange could be expected to rise more dramatically.

The Departments of Commerce and Labor advised us by letters dated September 8, 1971, and October 4, 1971, respectively, that the Exchange had not effectively served its purpose because of the lack of comprehensiveness and

timeliness of the information in the system. The Department of Commerce expressed the view that a central, comprehensive, timely, and accurate file of information on current research and development projects would be a useful and necessary tool for Federal and private managers of research and development activities. The Department of Labor noted that some fundamental changes would have to be made if the Exchange is to work effectively in research areas of interest to the agency.

NSF commented by letter dated October 21, 1971 (see app. III), that the Exchange had been forced to rely on voluntary cooperation for information concerning agency research activities which the Exchange needed to perform its function. This voluntary cooperation, according to NSF, had been only marginally satisfactory and was far removed from the level of response needed to meet the objectives of the Exchange.

Most agencies concurred in our recommendation that a study should be made to determine the need for continuing operations of the Exchange and that all Federal agencies should be required to submit information on a timely basis to the Exchange if its operation is continued.

NSF and the Department of Commerce, however, stated that they did not believe a study of the Exchange was needed. NSF pointed out that, over the past 10 years, several surveys and studies of the Exchange had been made by management consultant organizations and congressional committees and that the Office of Management and Budget should review those studies and take appropriate action.

The Department of Commerce expressed the view that an information system, such as the Exchange, was necessary and that the Department of Commerce had a strong interest in the effectiveness of the Exchange and in the overall Federal technical information system of which the Exchange was a part. To provide improved public access to Federal technical information, Commerce established in 1970 the National Technical Information Service which collects, processes, and distributes reports on completed Federal research and development in much the same manner that the Exchange handles reports of ongoing Federal research and development. The

Department of Commerce believes that the Exchange should be transferred to Commerce and consolidated with the National Technical Information Service to form a single organization to provide one convenient central source of information on Federal research and development activities.

The Smithsonian Institution advised us that it concurred strongly in the concept that mandatory input by all Federal agencies was most desirable at this time if more complete and comprehensive coverage of the Federal programs was to be quickly reached. The Smithsonian stated, however, that it believed that the Exchange had been overly studied by various groups and congressional committees but that it would not oppose another study if the Office of Management and Budget believed such a study was necessary to establish the need for a centralized information system, such as the Exchange.

Subsequently the Office of Management and Budget, by letter dated November 26, 1971 (see app. I), advised us that it agreed with our recommendation that further study of the Exchange would be appropriate at this time and that the Smithsonian Institution had agreed to contract for such a study. The Office stated that it would closely review the study at each stage and that, on the basis of study results, decisions would be made regarding the future of the Exchange and the establishment of a policy requiring mandatory reporting of all current and pertinent information to the Exchange.

The Department of Transportation recommended that any study be conducted jointly by the representatives of the executive and the legislative branches of the Government. The study should not be limited to a single information activity like the Exchange but should include the whole of the Federal research and development project inventory and reporting activities and should consider how these could be interrelated and how the Exchange could help in establishing better and more economical interagency exchange of research and development management and policy information.

The Department of the Interior proposed that all potential users of the Exchange's services be afforded the opportunity to develop mutually satisfactory policies of submission, type, and form of information to be available to the users.

The Atomic Energy Commission stated that it believed that principal attention should be given to identifying the research and development disciplines for which there is an important need for Exchange services and to identifying the costs which would be incurred in developing and furnishing such information in relation to the benefits expected to be received.

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

NOV 26 1971

Mr. A. T. Samuelson
Director
General Accounting Office
Washington, D. C. 20548

Dear Mr. Samuelson:

This is in response to your letter of August 18, 1971, requesting the views of this Office regarding the draft of a proposed report to the Congress on your review of the Science Information Exchange.

[See GAO note.]

With regard to the recommendations in the draft report, I agree that further study of the Exchange would be appropriate at this time. The Smithsonian Institution has agreed to contract for such a study. The study will be closely reviewed at each stage by this Office. Decisions regarding the future of the agency and the establishment of a policy requiring mandatory reporting of all currently pertinent information to the Exchange would be based on the results of the study.

Sincerely,

Casper W. Weinberger
Deputy Director

GAO note: Deleted comments refer to material contained in draft report but omitted from final report.

APPENDIX II

SMITHSONIAN INSTITUTION
Washington, D.C. 20560
U.S.A.

SEP 28 1971

Mr. Lloyd G. Smith
Associate Director
U. S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Smith:

The Smithsonian Institution has carefully reviewed the Comptroller General's draft of a proposed report to the Congress of the United States on a "Review of the Effectiveness of the Science Information Exchange - National Science Foundation, Smithsonian Institution" and provides the following comments on the review as requested.

With regard to the Findings and Conclusions (pp. 1-2), the Smithsonian concurs in the finding that the Government agencies have not systematically and promptly furnished their total research and development information to the Exchange, and that they have not been required to do so. It is also true that usage of the Exchange was lower in FY 1970 than in FY 1968, but it is respectfully submitted that this decline was the natural first reaction to the imposition of services fees beginning in FY 1969, at a time when agencies had made no provision for funds for such services previously provided without charge. We can state further that usage has substantially increased in nearly all categories of service over FY 1970-1971, both in terms of numbers of requests and in terms of total dollar cost of all services. (See Attachments 1-4.)

[See GAO note 1, p. 27.]

The Institution concurs in the subsequent paragraphs of this section.

In regard to the Section Recommendations or Suggestions (pp. 2-3): The Institution feels that SIE has been overly studied already by numerous groups and Congressional Committees (see Attachment 5), but would not oppose still another study if OMB feels such a study is necessary to establish the need for a centralized information system such as SIE.

The Institution concurs strongly that mandatory input by all Federal Agencies is most desirable at this time if more complete and comprehensive coverage of the Federal program is to be quickly reached.

The Institution believes that the increasing demand for SIE services, in spite of the initiation of charges for information services, is a good indication of the users' need for this type of information. The increasing demand for catalogs of ongoing research programs in selective areas of special

interest and multiagency participation further attests this need. In addition to the requirement for Water Resources Research, two more recent examples of special interest are catalogs on Environmental Pollution and Pesticides in Water. Moreover, NOAA is giving serious consideration to an update of the Catalog of Marine Sciences Research prepared by the Exchange in FY 1969. These and other selective compilations of multiagency participation currently prepared by SIE can be quickly and more economically assembled from a centralized data bank with uniform indexing for all Federally supported research projects.

The Institution recognized that Chapter 1 is a very sound and accurate description of the Exchange and a commendable synoptic summary (except for the figure of 1.4 million dollars of support rather than the correct figure of 1.3 million dollars.)

[See GAO note 2, p. 27.]

One of the key tables indicating declining usage was "investigator reports" (page 14) which decreased by 90% from 1968 to 1970. This product costs $2 per item and only represented a total income of $5,000 in FY 1970 -- less than 5% of the total output products. The drastic decrease in this one item "investigator reports" was due to policy changes, by important users, e.g. redesigning of the research grant application form and spot checking instead of total checking of all investigators, rather than decreasing interest in the total services of the data bank. Decreasing demand for this one item has been apparent for some years and has prompted SIE to turn its attention and efforts to other lines of information services and products in response to changing user needs and interests.

[See GAO note 2, p. 27.]

APPENDIX II

[See GAO note 2, p. 27.]

The Report cites the Peat, Marwick, and Livingston survey that "Agencies' management use of the Exchange involved, to a large extent, functions more appropriately discharged by Agencies' internal information systems". The Institution would call attention to the fact that even in FY 1972, few Agencies have viable internal automated information systems and that the bulk of Agency requests on SIE are for information about what other Agencies are doing rather than information about their own internal programs. SIE does provide information on a given agency's internal program in cases where an agency does not have an internal automated information system of this kind.

Another citation from the PML survey is that "Agencies having good internal systems provided machineable output to but did not often query the Exchange". To this conclusion we submit SIE records for three significant information products that approximate 40% of SIE's total output. The four biggest users in FY 1971 were:

DOD	283	inquiries
HEW	223	"
VA	161	"
USDA	58	"

Two of these have well developed internal information systems of their own and yet they were among the four biggest users in FY 1971. Furthermore, the first three were also the biggest users in FY 1969 at the time of the PML survey. It does not seem likely that an agency internal automated system could provide information about other agencies' activities in areas of mutual interest.

Nearly all Federal Agencies actually increased their usage in the area of subject searches during 1971. A more complete file of research projects would be advantageous and would probably increase usage. At least 1/3 of SIE user income is contributed by Federal Agencies to prepare catalogs covering broad subject areas in which many agencies participate.

In summary, the demand for SIE services appears to be increasing and the predominance of this increase is Federal use as reflected by both volume of requests and dollar income. This strongly suggests Federal users do find SIE a useful service and are willing to pay for it even though it is not complete in coverage. As user education programs increase and completeness of the data bank is achieved use of the Exchange can be expected to rise even

more dramatically. The avoidance of unwarranted duplications in just a few cases could easily save the taxpayers the cost of the entire SIE budget. The need for mandatory input is obvious as it will help to make the data base more useful and increase the number of users of the data bank as has been suggested.

Very minor changes in the text on two pages are noted and attached (Attachments 7 and 8). These changes are suggested to more correctly describe and clarify the SIE operation.

Sincerely yours,

S. Dillon Ripley
Secretary

Enclosures

GAO notes:

1. All attachments to this letter have been considered in the preparation of our final report but copies of the attachments have not been included.

2. Deleted comments refer to material contained in draft report but omitted from final report.

APPENDIX III

NATIONAL SCIENCE FOUNDATION
OFFICE OF THE DIRECTOR
WASHINGTON, D.C. 20550

OCT 21 1971

Mr. Lloyd G. Smith
Associate Director, Civil Division
United States General Accounting Office
Washington, D. C. 20548

Dear Mr. Smith:

I appreciate the opportunity to comment on the GAO draft of the report to Congress, "Review of the Effectiveness of the Science Information Exchange, National Science Foundation, Smithsonian Institution."

Before commenting on the raft report, I would like to reply to your request, in the transmittal letter, for comments as to why the Foundation has not considered it necessary to make greater use of the Exchange for planning purposes.

The service which the Exchange can best provide is focused on the record of research activity which is supported by Federal agencies (and other participating agencies). From this body of information, if maintained up to date and reasonably complete, SIE can retrieve a variety of useful reports, including technical information about individual projects. Although this sort of information has some value in the planning and coordination of agency programs, its value for this purpose is limited. In planning, far greater emphasis is placed upon information concerning the present and future plans for the support of research by other agencies rather than on actions taken in the present or earlier fiscal years. This includes plans for development of new programs; changes in emphasis in existing programs; the content and level of current year programs and related statistical trends for past years. Much of this information is undergoing change at the time it is needed, influenced by the same dynamic factors which influence Government policy, and it can best be provided by the agencies themselves. Except for the historical data, it is not practical to expect this sort of information, vital to the planning and coordination of Federal research activities, to be maintained by SIE. On the other hand, in looking to problem areas completely new to an agency, the SIE can quickly reveal a broad spectrum of other agency interests that provides valuable clues on how to start meeting new research needs. This can be especially valuable to agencies that are not customarily heavy supporters of research.

Concerning the draft report, our comments follow:

Findings and Conclusions (Chapters 2 and 3)

The report states that Government agencies have not been required to provide, and have not systematically provided, complete research and development information to the Exchange. As a result, the Exchange cannot provide agencies engaged in research with accurate and complete information on current research and development efforts.

The Foundation believes that the findings and conclusions are a fair statement of the present operating problems of the Science Information Exchange. SIE has been forced to rely upon voluntary cooperation for information concerning agency research activities which SIE requires to perform its function. This has been only marginally satisfactory and is far removed from the level of response required to meet the objectives of the Exchange.

Under "Findings and Conclusions," it may be well to add nongovernment organizations to the list of important users of the services. Information provided to us by the SIE Council indicates that non-Federal users have contributed approximately one-third of the user charge income to the SIE during the last two fiscal years.

Although data available through 1970 may have shown a substantial decline in Federal Agency use of the Exchange, probably due to the adoption in 1969 of user charges, we believe use has begun to pick up again in 1971.

Conclusion and Recommendation (Chapter 4)

The report notes that the Peat, Marwick, Livingston and Company 1969 study stated that the services traditionally provided by the Exchange were becoming less valuable to the Federal scientific community and would eventually be superseded through the development of internal agency systems.

We do not believe that the furnishing of information to Federal agencies about their own research activity was the primary goal of the Exchange. In our opinion, the principal benefit a centralized service such as SIE can perform is providing a single response to users about all Federal research support activity. We believe that SIE's function should be complementary to but not competitive with the information systems of the Federal agencies.

The report recommends that OMB conduct a study to determine whether

the Exchange is needed and, if so, it should establish a policy requiring that pertinent information be submitted in a timely manner to the Exchange by all agencies.

We do not believe another survey of the Exchange is needed to evaluate it, since there have been six critical surveys of SIE over the past ten years by expert management consultant organizations, and ten studies by Congressional Committees. Rather, we believe that the recommendation should be that OMB review the studies already made and take appropriate action.

Representatives of the Foundation will be pleased to meet with you to discuss the draft report in more detail.

Sincerely yours,

W. D. McElroy
Director

APPENDIX IV

PRINCIPAL OFFICIALS RESPONSIBLE FOR THE ADMINISTRATION OF THE ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
OFFICE OF MANAGEMENT AND BUDGET		
DIRECTOR:		
George P. Shultz	July 1970	Present
Robert P. Mayo	Jan. 1969	July 1970
Charles J. Zwick	Jan. 1968	Jan. 1969
Charles L. Schultze	June 1965	Jan. 1968
Kermit Gordon	Dec. 1962	June 1965
NATIONAL SCIENCE FOUNDATION		
DIRECTOR:		
H. Guyford Stever	Feb. 1972	Present
Raymond L. Bisplinghoff (acting)	Jan. 1972	Feb. 1972
William D. McElroy	July 1969	Jan. 1972
Leland J. Haworth	July 1963	June 1969
Alan T. Waterman	Apr. 1951	June 1963
DEPUTY DIRECTOR:		
Raymond L. Bisplinghoff	Oct. 1970	Present
Vacant	June 1970	Oct. 1970
Louis Levin	Oct. 1969	June 1970
Vacant	July 1968	Oct. 1969
John T. Wilson	July 1963	July 1968
ASSISTANT DIRECTOR FOR NATIONAL AND INTERNATIONAL PROGRAMS (note a):		
Thomas B. Owen	June 1970	Present
Vacant	Oct. 1969	June 1970

APPENDIX IV

	Tenure of office	
	From	To
NATIONAL SCIENCE FOUNDATION (continued)		
HEAD, OFFICE OF SCIENCE INFORMATION SERVICE:		
Melvin S. Day	Feb. 1971	Present
John R. Pasta (acting)	Jan. 1971	Feb. 1971
Burton W. Adkinson	Dec. 1957	Jan. 1971
SMITHSONIAN INSTITUTION		
SECRETARY:		
S. Dillon Ripley	Feb. 1964	Present
Leonard Carmichael	Jan. 1953	Jan. 1964
UNDER SECRETARY (note b):		
James Bradley	May 1970	Present
ASSISTANT SECRETARY (note b):		
James Bradley	Jan. 1961	May 1970
ASSISTANT SECRETARY (Science):		
David Challinor (acting)	Jan. 1971	Present
Sidney R. Galler	Sept. 1965	Jan. 1971
SMITHSONIAN SCIENCE INFORMATION EXCHANGE, INCORPORATED		
PRESIDENT (note c):		
David Hersey	Jan. 1972	Present
Monroe Freeman	Sept. 1961	Dec. 1971
VICE-PRESIDENT (note c):		
Vacant	Jan. 1972	Present
David Hersey	July 1961	Dec. 1971

[a]This position was authorized by Public Law 90-407, amending the National Science Foundation Act of 1950, effective July 18, 1968, but was not established until October 27, 1969.

[b]The Board of Regents of the Smithsonian Institution on May 20, 1970, established the position of Under Secretary and eliminated the position of Assistant Secretary.

[c]Prior to incorporation of the Exchange in June 1971, the position of president was designated director and the position of vice-president was designated deputy director.

Copies of this report are available from the U. S. General Accounting Office, Room 6417, 441 G Street, N W., Washington, D.C., 20548.

Copies are provided without charge to Members of Congress, congressional committee staff members, Government officials, members of the press, college libraries, faculty members and students. The price to the general public is $1.00 a copy. Orders should be accompanied by cash or check.